

CLAIMS

1. A support element for an integrated module for blood treatment, comprising:
 - a base body;
 - 5 - at least a first and at least a second connector associated to the base body and distanced one from another, destined to receive and engage with corresponding counter-connectors of a blood treatment device which is mountable on the support element.
- 10 2. The support element of claim 1, wherein the first and the second connectors are directly constrained to the base body.
3. The support element of claim 2, wherein the first and second connectors are made in a single piece with the base body.
- 15 4. The support element of claim 1, comprising at least a third connector, distanced from said first connector and from said second connector and directly constrained to the base body, said first, second and third connectors defining pairs of connectors having differentiated interaxes there-between for engaging to
20 corresponding pairs of counter-connectors associated to various blood treatment devices which are mountable on the support element.
5. The support element of claim 4, wherein the third connector is made in a single piece with the base body.
- 25 6. The support element of claim 1, wherein each of said connectors affords a fluid passage having a first end portion, destined to be placed in fluid communication with a corresponding channel in a respective counter-connector on the blood treatment device, and a second end portion, destined to be placed in fluid communication with a fluid distribution circuitry associable to
30 the base body.

7. The support element of claim 6, wherein each of the said connectors comprises:

- a tubular channel defining said first end portion,
- a sealing collar set in a radially external position with respect to the tubular channel, and
- a connecting wall developing continuously between an external lateral surface of said tubular channel and an internal lateral surface of said sealing collar to define an annular seating for engagement of each counter-connector.

8. The support element of claim 7, wherein the tubular channel defining said first end portion is coaxially arranged with respect to the sealing collar, said annular seating exhibiting a bottom which is delimited by said connecting wall.

9. The support element of claim 8, wherein said annular seating exhibits a radial dimension which increases progressively in a direction moving away from said bottom wall.

10. The support element of claim 9, wherein said annular seating exhibits: a first zone, adjacent to said bottom wall and having a constant radial dimension; a second zone, distal of said bottom wall and having a constant radial dimension which is greater than the radial dimension of the first zone; and a third zone, which is a transition zone between the first zone and the second zone and has a progressively increasing dimension in a distancing direction from said bottom wall.

11. The support element of claim 7, wherein the tubular channel and the sealing collar of each connector are parallel to one another as they emerge from the base body, defining a single coupling direction for coupling with corresponding counter-connectors of a blood treatment device.

12. The support element of claim 4, comprising a fourth connector, distanced from said first, second and third connectors, which

fourth connector is made in a single piece with the base body and defines, with at least one of said first, second and third connectors, a further pair of connectors which can be engaged to a corresponding pair of counter-connectors associated to a blood treatment device which is mountable on the support element.

13. The support element of claim 12, wherein the fourth connector comprises:

- a central cylindrical positioning body;
- a sealing collar, set in a radially external position to the cylindrical positioning body; and
- a connecting wall, developing continuously between an external lateral surface of said cylindrical positioning body and an internal lateral surface of said sealing collar;

said fourth connector defining a connecting and sealing site for a counter-connector of the blood treatment device.

14. The support element of claim 2, wherein said connectors and said base body are made of a rigid material in order to offer a mechanical support for the blood treatment device.

15. The support element of claim 4, wherein said connectors are aligned one to another.

16. The support element of claim 2, wherein said connectors are arranged on a side of the base body.

17. The support element of claim 1, wherein said base body comprises a frontal wall and a perimeter wall, which perimeter wall is connected by a side thereof to the frontal wall and defines a works area within which at least a portion of a fluid distribution circuitry destined to be associated to the support element can be housed.

18. The support element of claim 17, comprising an auxiliary structure extending laterally and externally with respect to

said works housing area from a base zone of the perimeter wall, said connectors emerging from said auxiliary structure.

19. The support element of claim 4, wherein said connectors are not aligned one to another.

5 20. The support element of claim 1, wherein the base body (6) comprises a frontal wall, from which said connectors directly project, and a cover associated to a perimeter wall at an opposite edge thereof with respect to the frontal wall.

21. An integrated module for fluid treatment, comprising:

- 10 - a support element as in any one of the preceding claims;
- at least one blood treatment device engaged on the support element;
- a fluid distribution circuitry associated to the support element and cooperating with the blood treatment device.

15 22. The integrated module of claim 21, wherein said blood treatment device is fixed to the base body by at least a pair of said connectors.

20 23. The integrated module of claim 22, wherein said pair of connectors is interpositioned between the counter-connectors and a portion of the fluid distribution circuitry.

24. The integrated module of claim 21 comprising the support element of claim 6, wherein said blood treatment device comprises:

- a containment body;
- 25 - at least one semi-permeable membrane operating internally of the containment body and defining a first chamber and a second chamber;
- a first counter-connector and a second counter-connector, associated to the containment body and fixed to respective connectors associated to the base body, at least one of the

- first counter-connector and the second counter-connector being placed in fluid communication with the second chamber of the blood treatment device and with respective first end portions of said connectors;
- 5 - at least one inlet port to the first chamber; and
 - at least one outlet port from the first chamber.
25. The integrated module of claim 24, wherein the fluid distribution circuitry comprises at least one discharge line of a discharge fluid, placed in communication with the second end
10 portion of one of said connectors.
26. The integrated module of claim 25, wherein the fluid distribution circuitry comprises at least one fresh dialysis liquid supply line, placed in communication with the second end portion of another of the connectors.
- 15 27. The integrated module of claim 21, wherein the fluid distribution circuitry comprises at least one blood circuit line having a blood withdrawal branch, placed in communication with the inlet port of the first chamber, and at least one blood return branch, placed in communication with the outlet port of
20 the first chamber.
28. The module of claim 25, wherein at least one of said lines is constrained to the support element, defining at least one tract of tubing which is U-shaped in relation to the support element and which is destined during operation to cooperate with a
25 peristaltic pump.
29. The integrated module of claim 28, wherein the at least one U-shaped tract of tubing extends internally or externally with respect to the perimeter wall of the support element.
30. An assembly process for an integrated module for fluid treatment
30 comprising stages of:
- predisposing a support element as in any one of the preceding

claims 1 to 20;

- fixing a blood treatment device to the support element;
- associating a fluid distribution circuitry to the support element and to the blood treatment device.

5 31. The process of claim 30, wherein the fixing stage comprises sub-stages as follows:

- selecting of a pair of connectors to which the counter-connectors of the blood treatment device are to be fixed;
- depositing a prefixed quantity of glue in the annular seatings
10 of each connectors which has been selected;
- at least partially inserting each counter-connector into a respective annular seating in order to obtain a mechanical lock and a liquid-proof seal.

15 32. The process of claim 31, wherein during said insertion stage, at least one portion of the prefixed quantity of glue is arranged in said second zone of the respective annular seating.

20 33. The process of claim 32, wherein at an end of said insertion stage, a volume of said prefixed quantity of glue added to a volume of the portion of counter-connector housed in the annular seating is less than a total volume of the annular seating.

34. The process of claim 30, wherein the stage of associating a fluid distribution circuitry to the support element and to the blood treatment device comprises sub-stages of:

- liquid-proof fixing of an end portion of a discharge line of a
25 discharge fluid with the second end portion of one of said connectors;
- sealedly fixing an end portion of a fresh dialysis liquid supply line to the second end portion of another of said connectors;
- sealedly fixing an end portion of a blood withdrawal branch to

the inlet port of the first chamber, and an end portion of a blood return branch to the outlet port of the first chamber.

35. A support element for an integrated module for blood treatment, comprising:

- 5 - a base body made of a rigid material;
- at least a first and a second connectors realized in a single piece with the base body and distanced one from another, said connectors being destined to engagingly receive corresponding counter-connectors of a blood treatment device which is mountable on the support element;
- 10 - each of said connectors defining a fluid passage having a first end portion, conformed as a tubular channel and destined to be placed in fluid communication with a corresponding channel in the respective counter-connector of the blood treatment device,
- 15 and a second end portion, destined to be placed in fluid communication with a fluid distribution circuitry associable to the base body;
- a sealing collar placed in a radially external position to the tubular channel, the tubular channel and the sealing collar of each connectors emerging parallel to one another from the base body, to define a single coupling direction with corresponding counter-connectors of the blood treatment device; and
- 20 - a connecting wall developing continuously between an external lateral surface of said tubular channel and an internal lateral surface of said sealing collar to define an annular seating for engagement of each counter-connector.
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36. An integrated module for fluid treatment, comprising:

- the support element of claim 35;
- at least one blood treatment device fixed to the support element by at least a pair of said connectors;
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5 said blood treatment device comprising: a body of containment;
 at least one semi-permeable membrane operating internally of the
 body of containment and defining a first chamber and a second
 chamber; a first counter-connector and a second counter-
 connector, associated to the body of containment and fixed to
 10 respective connectors associated to the base body, the first
 counter-connector and the second counter-connector being placed
 in fluid communication with the second chamber of the blood
 treatment device and with respective first end portions of the
 15 connectors; at least one inlet port to the first chamber; and at
 least one outlet port from the first chamber;

- a fluid distribution circuitry associated to the support element
 and cooperating with the blood treatment device;

15 said fluid distribution circuitry comprising at least one
 discharge line of a discharge fluid, placed in communication
 with the second end portion of one of said connectors, at least
 one blood line having a blood withdrawal branch, placed in
 communication with the inlet port of the first chamber, and at
 20 least one blood return branch, placed in communication with the
 outlet port of the first chamber.

37. A manufacturing process of an integrated module for fluid
 treatment as in claim 36, comprising stages of:

- predisposing the support element;
- predisposing the blood treatment device;
- 25 - selecting a pair of connectors to which counter-connectors of
 the blood treatment device are to be fixed;
- depositing a prefixed quantity of glue in the annular seatings
 of each selected connector;
- at least partially inserting each counter-connector into a
 30 respective annular seating in order to obtain a mechanical lock
 and a liquid-proof seal; at an end of said insertion stage, a

volume of said prefixed quantity of glue added to a volume of the portion of counter-connector housed in the annular seating being less than a total volume of the annular seating;

- associating the fluid distribution circuitry to the support element and to the blood treatment device.

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